

ATTACHMENT 1 - LAHAINA WASTEWATER RECLAMATION FACILITY TRACER STUDY SCOPE OF WORK

1.0 Location:

The study will cover the area of Lahaina, the Island of Maui, State of Hawaii as depicted in Figure 1 <<I need a map>>, <<I could use more specific boundaries whether it is watershed, street, stream, or lat/long>>

2.0 Purpose

The Lahaina Wastewater Reclamation Facility (LWRF or facility) disposes of wastewater effluent into injection wells located approximately 1900 feet from the shoreline between Black Rock and Honokowai Pt, Lahaina, Hawaii. The main purpose of this Scope of Work is to conduct a tracer study to confirm the locations of the emerging discharge of injected effluent into the coastal marine waters and determine a travel time from the facility's injection wells to coastal waters.

3.0 Background

Maui County owns and operates the facility located at 3300 Honoapiilani Highway, Honokowai, Lahaina, Maui in Hawaii. The facility treats domestic wastewater to secondary treatment levels with advanced sand filtration and disposes of most of the treated wastewater into four (4) gravity fed Class V Underground Injection Control (UIC) injection wells. The four injection wells have a total depth of 165 to 255 feet. Total injection volume into the UIC wells averages about 3 to 5 million gallons per day (MGD). The geology into which treated effluent is injected consists of highly permeable basalt lava flows. Injection of treated wastewater effluent at the wells forms a buoyant plume within the aquifer, extending from the wells to the coast.

The County has a federal UIC permit for the injection wells, which expired on June 12, 2005. The conditions of the expired permit continue in force until the effective date of a new permit. The United States Environmental Protection Agency (EPA) is processing a permit renewal application (available at <http://www.epa.gov/region9/water/groundwater/uic-pdfs/LahainaPermitApp.pdf> for background on geology, injection well operation, facility map, etc.) and addressing other regulatory requirements related to the facility's operation.

EPA is investigating the possible discharge of pollutants from the facility injection wells to the coastal waters of the Pacific Ocean along the Kaanapali coast of Maui. In 2007 and 2008, the University of Hawaii¹ (UH) and the U.S. Geological Survey² (USGS) conducted inherent tracer

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¹ Dailer, M.L., Knox, R.S., Smith, J.E., Napier, M., Smith, C. M., (2010) Using delta-15N values in algal tissue to map locations and potential sources of anthropogenic nutrient inputs on the island of Maui, Hawai'i, USA. Mar. Pollut. Bull. doi:10.1016/j.marpolbul.2009.12.021

² Hunt, C.D., Jr., and Rosa, S.N., 2009, A multitracer approach to detecting wastewater plumes from municipal injection wells in nearshore marine waters at Kihei and Lahaina, Maui, Hawaii: U.S. Geological Survey Scientific Investigations Report 2009-5253, 166 p.

studies, which found substantial evidence that injected effluent from the facility is emerging from submarine springs into the coastal water around Kahekili Beach Park along the Kaanapali coast-line. In order to better understand wastewater plume movement, EPA has determined that a tracer study must be conducted to determine hydrologic characteristics and the time of travel from injection to the emergence of the effluent in the coastal water. This tracer study is intended to provide important data about the hydrological connection between the effluent discharge and the coastal waters. Therefore, the work must deliver accurate, unbiased, and defensible information.

EPA has funded the State of Hawaii EPA is working jointly with Hawaii Department of Health (HDOH) to implement this introduced tracer study. DOH has requested assistance from and with U.S. Army Corps of Engineers, Honolulu District (POHACOE) through the Planning Assistance Program to complete this study. EPA has confirmed that DOH may use EPA funds as work-in kind match for this study (see Attachment 2). In accordance with Section 2007 of the Water Resources Development Act (WRDA) 2007 and its implementing guidance, POH may accept other federal dollars as non-federal match with the written approval of the other federal agency to the non-federal sponsor. to direct and oversee this introduced tracer study.

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4.0 EPA Technical Direction for DOH Work In-Kind

DOH intends to issue a contract to accomplish the activities designated as “work in-kind” for this study using EPA provided funds (see section ***). Specific to the use of EPA funds, The HDOH Work Assignment Manager (WAM) is authorized to provide technical direction which clarifies the SOW. The HDOH WAM will consult with the EPA contacts prior to issuing technical direction. Before accepting any action under technical direction, the DOH Contractor shall ensure that the technical direction falls within the scope of work. Technical direction will be issued in writing or confirmed in writing, by the HDOH WAM, within five (5) calendar days after verbal issuance. The HDOH WAM will forward a copy of the technical direction letter to the EPA contact. Technical direction must be within the scope of the contract. Technical direction includes (1) direction to the DOH Contractor which assists the Contractor in accomplishing the SOW and (2) comments on and approval of proposals, reports and other deliverables. **The DOH Contracting Officer is the only person authorized to make changes to this contract. Any changes must be approved by the Contracting Officer in writing, as an amendment and/or a modification to the contract.**

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5.0 Technical Direction for POH Funded Actions

Because the technical skills needed to complete the POH funded actions are research in nature and would benefit from the neutrality of a research institution, the intent is for POH to issue a request for research proposal (RFP) through the Hawaii and Pacific Islands Cooperative Ecological Services Unit (CESU) Agreement. In the event that no proposals are received or proposals are inadequate, POH will evaluate other mechanisms to obtain adequate technical research skills to complete the study.

EPA and DOH will act as primary subject matter experts – providing the technical direction for the SOW, assisting in the review of the proposals, and conducting quality control review on the interim and final products00.

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6.0 Study Schedule

Following are the tasks to be completed for this study. Dates are based on the days after the Cost Share Agreement is executed and funds and/or work in-kind documentation is received.

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<u>TASK</u>	<u>RESPONSIBLE ENTITY</u>	<u>BUSINESS DAYS AFTER CSA EXECUTION</u>
Project Management Plan	POH	15 days
Final SOW for Phase I and Phase II Tasks	POH and DOH	30 days
Issuance of CESU RFP	POH	40 days
Receipt of CESU Proposals	POH	120 days
Issuance of CESU NTP	POH	135 days
Issuance of DOH Contractor NTP	DOH	135 days
Draft <u>Phase I</u> CESU Research Findings <u>Phase I</u> for Review	POH	***
Draft <u>Phase II</u> DOH Contractor Findings <u>Phase II</u> for Review	DOH	***
Final Phase I CESU Research Findings	POH	15 days after draft review comments received
Final Phase II DOH Contractor Findings	DOH	15 days after draft review comments received
Draft Tracer Study Report for Review	POH	15 days after CESU/DOH Contractor Findings Received
Final Tracer Study Report	POH	15 days after draft report comments recieved
<u>Financial Closeout</u>	<u>POH</u>	<u>365 days</u>

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7.6.0 Scope of Work: Introduction

This study will entail the release of known quantities of fluorescent dyes into the subsurface environment via injection wells at LWRF and recovery of the dyes at near shore marine water locations. Multiple releases of fluorescent dye, sometimes duplicating previous releases, may be necessary to properly complete the project. The work includes background documents review, field survey, tracer selection, design planning, work plan writing, background fluorescence study, tracer study implementation, breakthrough curve (BTC) analyses, interpretation, and report writing. This Scope of Work presents the steps for the tracer test in a phased approach:

Phase I (POH Funded Action)

Review of literature, research publications and prior studies. Design of the study will require a desk top review of the past tracer study report conducted in 1993, (titled Effluent Fate Study Lahaina Wastewater Reclamation Facility, Maui, Hawaii, dated February 1994), [University of Hawaii](#) and US [Geological Services \(USGS\)](#) published studies as cited in the background section above, and other useful background sources.

Field Reconnaissance. The initial design will consist of planning the dye-release activities, determining sampling sites, and establishing a sampling strategy. Field work must be conducted to identify sampling locations for groundwater seeps, to tour the facility, and to record information useful in the design of the tracer study.

Tracer Study Design. This step includes selecting the type and amount of tracer, defining relevant tracer properties to meet the study goals, evaluating interference from the chemistry of the effluent characteristics and determining the best dye release procedures. Modeling tools can be used to determine dye concentrations, predict tracer-breakthrough characteristics, and the time intervals needed for effective sampling of the passage of the tracer. This design work will also delineate the study area and propose an achievable monitoring strategy for a successful test.

Tracer Study Work plan. A written work plan will explicitly describe how the test will be conducted (e.g., how much of a specific tracer(s) will be used, duration of tracer addition, injection location, sampling locations, etc.). A monitoring strategy, sampling and analysis plan including test methods and duration and frequency of testing, Quality Assurance/Quality Control procedures, and a proposed schedule will also be part of this written plan.

Background Study. The Background Monitoring task involves the monitoring of the specified submarine seeps and other locations in the study area for background concentrations of fluorescence (or other chosen tracer type) from man-made substances and natural interference.

Phase II ([DOH Funded Action – Provided as Work In-Kind](#))

Tracer Study Implementation. This is actual deployment of the EPA-approved tracer study work plan, including the required documentation (field notes, etc.). Monitoring, sampling and analysis will be implemented as described in the approved work plan, but minor changes based on unanticipated field conditions may be necessary. Timing from detecting the first positive confirmation of tracer through the last detection will be critical to the usefulness of the results.

Test Interpretation. Test interpretation will be quantitative to deliver useful and reliable information. A quantitative test does not rely solely on the detection of the introduced fluorescent substance at the sampling locations but also on the observation of the trend in fluorescence (from background levels to peak concentration and back to background levels) as the dye passes the sampling points.

Report on Findings and Interpretation. The report will include a narrative description of the tracer study implementation. The interpretation of the results with a time of travel determination shall be documented in the report.

87.0 Scope of Work: Phase I Tasks (POH Funded Actions)

Task 1: Project Work plan for Preparation, Project Management, and Closeout.

POH will oversee the development of the Study work plan including the project management plan, review the workplans provided by the researcher/contractor and provide assistance to DOH in review of the Phase II workplan to ensure consistency and integration of the activities.

POH will provide overall project management support for Phase I and Phase II tasks, will coordinate reviews between EPA, DOH and the researcher/contractor (assisting DOH with coordination as needed for DOH contractor) and will oversee the compilation of the Phase I and Phase II tasks into the final and complete study document. POH will also be responsible for all technical and financial closeout activities associated with the study.

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Task 2: Review of Literature, Research Publications and Studies.

Prior to the initial field survey, review the following types of resources, as available, pertaining to the geologic and hydrologic features from the facility to the marine waters in the study area between Black Rock and Honokowai Point.

- Aerial or satellite photographs/images
- Topographic maps
- Geologic/hydrologic documents
- Well logs
- Previous reports and research about the site

The Researcher/Contractor shall review and consider the past tracer study conducted in 1993 (titled Effluent Fate Study Lahaina Wastewater Reclamation Facility, Maui, Hawaii, dated February 1994), UH and USGS published studies as cited in the background section above, and other applicable background sources (e.g., UIC permit renewal application available at <http://www.epa.gov/region9/water/groundwater/uic-pdfs/LahainaPermitApp.pdf>). In particular, the geology and hydrology of the area shall be considered in the design of the study.

Task 3: Field Reconnaissance.

The Researcher/Contractor shall conduct field reconnaissance to support designing the study. The initial design work will consist of determining the best dye-release practices, the sampling locations, and the sampling strategy to have a successful test. To support these efforts, a field survey must include locating the specified submarine seeps in the near shore marine waters, determining other sampling locations, and recording physical characteristics of both the injected

effluent and ground water. The [Researcher](#)/Contractor shall tour the LWRP to become familiar with the operation, maintenance, and performance of the injection wells to consider for the dye-release procedures.

The field reconnaissance will also involve investigation of specified submarine seeps and any other locations in the near shore marine waters, which may be potential emergence points. A portion of the field work should be completed under conditions of moderate to high injection well flow and low tide so the dominant emergence points are active. The [Researcher](#)/Contractor shall measure and record physical characteristics of monitoring locations, such as the Global Positioning System (GPS) coordinates, a measurement or estimate of the discharge volume, measurement of the discharge temperature, specific conductance, salinity, and pH. For conducting a quantitative tracer test (see the interpretation task below), the [Researcher](#)/Contractor will need to measure or reasonably estimate discharge at each sampling station.

Four known submarine seeps, in particular, are important to include as sampling locations because they were confirmed by the UH and USGS studies as having wastewater effluent signatures from the facility. The [Researcher](#)/Contractor shall include the four submarine groundwater seeps in the vicinity of Kahekili Beach Park at the following locations: Seep 1 - Latitude 20°56'23"N (N20 56.391), Longitude 156°41'34"W (W156 41.581); Seep 2 - Latitude 20°56'19"N (N20 56.318), Longitude 156°41'35"W (W156 41.591); Seep 3 - Latitude 20°56'23.6"N, Longitude 156°41'34.5"W; and , Seep 4 - Latitude 20°56'18.7"N, Longitude 156°41'35.1"W. These seeps are approximately 2600 to 3400 feet from the facility injection wells.

Interviews with various local experts (ie, [Department of Land and Natural Resources, Division of Aquatic Resources](#) [DLNR-DAR], other UH or USGS researchers that have studied the area) and Maui County representatives may also be useful for review of injected effluent characteristics, local hydrology and geology, coastal water submarine spring or seep locations, and possible flow path(s) of the effluent plume.

Task 4: Tracer Study Design.

The [Researcher](#)/Contractor shall consider the expense and time to conduct the work and use their best professional judgment to accomplish the work to ensure the tracer study design will satisfy the purpose of the study. The [Researcher](#)/Contractor may consult with [POH](#), [HDOH](#) and EPA by conference call to discuss the approach for any of the design subtasks. Any clarifications may be provided by technical direction letter.

Subtask 4.1: Tracer Selection and Amount.

This step includes selecting the type and amount of tracer, defining relevant tracer properties to meet the study goals and evaluating interference from the chemistry of the effluent characteristics. This step will also include evaluation of the tracer properties to ensure a

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successful test under expected release and sampling conditions. The [Researcher/Contractor](#) shall consider modeling tools to determine the amount of tracer needed for injection, predict tracer-breakthrough characteristics, and the time intervals needed for effective sampling of the passage of the tracer.

Several fluorescent dye types may be considered for the tracing test. Table 1 lists the most commonly used dyes and their relevant properties; additional information may be found in Flury and Wai (2003) and Käß (1998, p. 18–122). Several of the dyes listed in Table 1 are preferred over the others (e.g., Acid Yellow 73 is the most preferred dye) for a variety of reasons (e.g., cost, fluorescence, ease of use, etc.). In terms of safety of their use in a public recreational area, many of the fluorescent dyes listed in Table 1 have been used for many years (e.g., Acid Yellow 73 has been used for >100 years) and with no significant reported adverse effects (Field et al., 1995; Behrens et al., 2001; Field, 2005).

Table 1. Typical fluorescent dyes used for hydrologic-tracing studies and their basic properties; after (Leibundgut et al., 2009, p. 67) and (Käß, 1998, p 18–122).

Fluorescent Dye Identification Name/Number				Fluorescent Dye Properties					
C.I. Generic Name	Common Name	C.I. Constitution Number	CAS Number	Excitation Maximum (nm)	Emission Maximum (nm)	Fluorescence Intensity (%)	Detection Limit (µg L ⁻¹)	Photochemical Decay Rate	Temperature Exponent T ⁻¹ (C°)
Acid Blue 9	Erioglaurine	42090	3844-45-9	?	?	?	?	?	?
Acid Red 50	Acid Rhodamine G Sulpho Rhodamine G	45220	5873-16-5	535	555	14	?	1.5	0.0035
Acid Red 52	Acid Rhodamine B Sulpho Rhodamine B	45100	3520-42-1	560	584 590 (Liquid)	30	0.03	1.3	0.028
Acid Red 87	eosin, eosine	45380	17372-87-1	515	535	18	0.01	182	-0.00036
Acid Red 92	Phloxine B	45410	18472-87-2	541	559	?	?	?	?
Acid Red 388	Rhodamine WT	...	37299-86-8	558	583	25a	0.02	0.84	0.027
Acid Yellow 7	Lissamine Flavine FF	...	2391-30-2	422	512	1.6	?	0.91	0.003
Acid Yellow 73	sodium fluorescein uranine	45350	518-47-8	491b (492) 438c	512b (513) 512c	100b 20c	0.001	100	0.0039
Basic Violet 10	Rhodamine B	45170	81-88-9	555	582	60	0.02	1.4	0.025
Direct Yellow 96	Diphenyl Brilliant Flavine 7GFF	...	61725-08-4	415	489	?	?	?	?
Fluorescent Brightener 15	...	?	?	345	439	3.6e	?	424	0.012
Fluorescent Brightener 22	Tinopal 5BM GX	?	12224-01-0	?	?	?	?	?	?
Fluorescent Brightener 28	Tinopal BBH Pure	40622	4404-43-7	349	439	2	?	?	?
Solvent Green 7	pyranine	59040	6358-69-6	460 407	512b 445c (512) 6c	18b 6c	0.06	24	0.0019
...	amino G acid	...	86-65-7	359	459	1.0	?	15	?
...	sodium naphthionate	...	130-13-2	325	420	18	0.2	27	?

a Calculated for dry mass.

b At pH = 9.5.

c At pH < 2.5.

d As a liquid.

e Accession number.

Subtask 4.2: Dye Release Procedures.

The ~~Researcher~~/Contractor shall determine the best dye release procedures for a successful test. This aspect of designing the test should consider if one or more of the injection wells should have a dye release with the rationale provided in the proposal for the test design. Because injection well #2 has the greatest capacity of the wells, the ~~Researcher~~/Contractor, at a minimum, shall plan dye injection to this particular well. The ~~Researcher~~/Contractor may also consider using different tracers for different wells.

Dye release procedures should establish the dye release rate, dye temperature and duration characteristics to best represent the flow path and travel rate of the injected effluent. Potable water may be used to flush the dye past the injection well formation so that less dye will be absorbed by the formation. The ~~Researcher~~/Contractor may consider the impact on the results of the dye test and the expense and time to conduct the test.

Subtask 4.3: Tracer Study Area.

To ensure dye emergence locations will not be missed during the investigation, this step of the study will rely on the desktop review and field survey to define and map the study area. Boundaries of the study area will also be defined by available hydrologic data and hypothesized groundwater flow from injection wells site to coastal water.

Subtask 4.4: Monitoring Strategy

The use of modeling tools to predict tracer-breakthrough characteristics and time intervals needed for effective sampling of the passage of the tracer should be considered. The ~~Contractor~~~~Researcher~~/Contractor shall determine the sampling strategy and methods to monitor for background fluorescence and emergence of the dye tracer. The ~~Contractor~~~~Researcher~~/Contractor shall also determine a timing schedule for tracer monitoring. Timing for detecting the first positive confirmation of tracer through the last detection will be critical to the usefulness of the results. The ~~Contractor~~~~Researcher~~/Contractor shall have a standard protocol to determine what constitutes background, positive, and negative (non-detect) results.

Numerous samples will be collected from within the dye cloud as it emerges from submarine seeps into the marine waters. The recreational use of the coastal area, surf, and weather conditions should be considered in developing the sampling strategy. For instance, in areas accessible to the public, it may be necessary to consider monitoring procedures which include redundant, backup sampling devices for each sampling location in the event that the primary device is damaged, lost or stolen.

The monitoring plan should describe how the submarine seeps will be sampled to insure that groundwater is captured by the sampling apparatus. It is also recommended that salinity, silica content, or other parameters be used to confirm that samples from springs or seeps contain groundwater.

Subtask 4.5: Tracer Study Design Proposal.

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Prior to the preparation of a written plan for the tracer study, collected and evaluated data will be used to propose the design plan. The ~~Contractor~~Researcher/Contractor shall submit a brief written proposal outlining the proposed tracer study design, including, but not limited to, the amount and type of tracer needed for injection, dye release procedures, predicting tracer-breakthrough characteristics, sampling methods, and the time intervals needed for effective sampling of the passage of the tracer. This proposal shall be subject to changes through discussion with ~~HDOH~~POH, DOH and EPA by conference call and written comments from ~~HDOH~~POH, DOH and EPA. Upon approval of the proposal, the ~~Contractor~~Researcher/Contractor shall write a detailed work plan for the study as described in Task 6.

Task 5: Tracer Study Work Plan.

The written work plan shall explicitly describe how the test will be conducted, how much of which tracer(s) will be used, where injected, where sampled, for how long, etc. The ~~Contractor~~Researcher/Contractor

shall also include a monitoring plan for background and tracer detection. Attachments to the work plan must include a sampling and analysis plan, Quality Assurance/Quality Control procedures (for field and laboratory), and a proposed tracer study schedule. The proposed schedule may change based on unpredictable weather or unanticipated events. The work plan shall identify the researchers and any other persons, who are expected to assist in conducting the study.

Task 6: Background Study.

The Background Monitoring task involves the monitoring of specified submarine seeps and other potential emergence points in the study area for background concentrations of fluorescence and/or other chosen tracer type, if applicable, from man-made substances and natural interference. From the effluent characteristics, some of the background substances will be predictable (e.g., the fluorescence presence of optical brighteners in municipal wastewater) and must be considered in early design planning. The results of the background concentrations will need to be considered in the quantitative interpretation of the results. The ~~Contractor~~Researcher/Contractor shall report the sampling locations and background concentrations. Field and laboratory QA/QC data and results shall be provided in this report for use in Phase II of the study implementation.

Since background fluorescence can be variable, it is important to know the background fluorescence the week prior to dye injection and determine its variability over a period of a few weeks prior to dye injection.

98.0 Scope of Work: Phase II Tasks (DOH Funded Actions for Work In-Kind Match)

Task 7: Tracer Study Implementation.

Subtask 7.1: Dye Release Notification

The Contractor shall notify EPA and [HDOHDOH](#) of the actual date of dye injection at least one week prior to the start of the activity. This notification shall be by email correspondence to the appropriate EPA and [HDOHDOH](#) contacts. The Contractor will need to coordinate the activity and arrange site access with Maui County Department of Environmental Management. Maui County will need adequate lead time to consider notification of any other local agencies and the local community in the immediate area of the pending fluorescent-dye release.

Subtask 7.2: Dye Injection and Monitoring.

This is actual implementation of the test design, including the required documentation (field notes, etc.). Unanticipated field conditions may make it necessary to modify the work plan. If any such changes become necessary, the Contractor shall notify DOH, send a proposed amendment, and obtain prior approval for any changes. An email correspondence to the DOH and EPA contacts will be acceptable to propose amendments and receive approval. All monitoring locations shall be prepared according to the work plan, or approved changes.

The Contractor shall implement dye release procedures as described in the approved work plan. Monitoring, sampling and analysis will be implemented as described in the approved work plan. Any unexpected occurrences will need to be noted and reported in the final report. The Contractor shall maintain and document the integrity of samples collected to produce data of legally defensible quality.

The [HDOHDOH](#) and EPA contacts shall be notified of schedule changes, at least 72 hours prior to the change. Prior consideration should have been given to adapt sampling methods to the recreational use of the public coastal area and to potential weather conditions, as described in the design task above.

Task 8: Test Interpretation.

Upon completion of the study, the Contractor shall provide analysis and interpretation of the results. The Contractor shall conduct a quantitative interpretation and consider additional analysis of results, if appropriate.

For quantitative interpretation, the observations are recorded on a plot of the fluorescence or dye concentration levels over time, called a breakthrough curve (see Figure). Where sufficient data exists, the Contractor shall provide a breakthrough curve. The breakthrough curve will show observation of the increase and decrease in fluorescence at the sampling location, which will improve confidence that the samples reflect

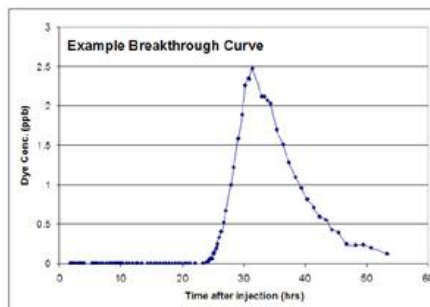


Figure: Example breakthrough curve for an injected dye tracer.

passage of the injected tracer rather than fluctuations in background fluorescence.

Breakthrough curve analysis will be used to determine the mean time of travel of the injected tracer. The Contractor shall calculate the average groundwater velocity based on the mean time of travel.

Task 9: Report on Field Work, Results, and Interpretation.

In this final report, the Contractor shall document the interpretation of the results with supporting analysis of the data. The Contractor shall also provide a narrative description of the tracer study implementation, any unexpected occurrences during the study, and an explanation of how any of these occurrences may have affected the results.

Data for all sites sampled and results with documentation of QA/QC samples shall be included in the report. Results shall highlight where positive tracer detections were found with a summary of first, peak, and last detection time. The Contractor shall provide a time of travel and groundwater velocity determination, a description of the variation in time of travel, and a map showing the spatial positions of all positive detections.

109.0 Researcher/Contractor Deliverables

Following is a general schedule of deliverables that will be placed in the requirements for both the POH funded Researcher/Contractor and the DOH funded Contractor.

The contractor shall submit all deliverables in Draft. The ~~HDOH~~DOH Work Assignment Manager will specify the expected date for the receipt of revised or finalized documents based on the amount and complexity of the revisions.

SUMMARY OF DELIVERABLES AND DUE DATES

Task	Deliverable	Due Date*
1	Work plan	Within 20 days after Contractor acknowledges receipt of SOW
	Revised Work plan	Within 7 days after receipt of HDOH DOH/EPA comments
1.1	Monthly Progress Reports	As per Contract

SUMMARY OF DELIVERABLES AND DUE DATES (Cont.)

Task	Deliverable	Due Date*
4	Conference call consultation with HDOH POH, DOH	At the start of
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and EPA for any of the Design Subtasks
Subtasks, as needed

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Subtask 4.5 Tracer Study Design Proposal 7 days after completion of
Study Design Subtasks

Revised Design Proposal Within 7 days after receipt
of ~~HDOH~~POH/DOH/EPA
comments

5 Tracer Study Work Plan Within 30 days of the Approved Proposal

Revised Study Work Plan Within 7 days after
receipt of ~~HDOH~~POH/DOH/EPA comments

6 Background Monitoring report Within 14 days of completion of
background monitoring

7 Tracer Study Implementation Dye Injection Notification Agreed upon schedule in Work plan

9 Report on Field work, Results, Interpretation Within 45 days after completion of Study

Revised Report Within 14 days after
receipt of ~~HDOH~~POH/DOH/EPA comments

*Note: All days are calendar days unless otherwise specified.

11.0 Points of Contact

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POH Contact:

Ms. Cindy S. Barger
Watershed Program Manager
US Army Corps of Engineers, Honolulu District
Civil and Public Works Branch (CEPOH-PP-C)
Bldg 230
Ft. Shafter, HI 96858
e-mail: cindy.s.barger@usace.army.mil
Phone: (808) 438-6940

DOH Contact:

Mr. Daniel Chang

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Location of Facility:

Lahaina Wastewater Reclamation Facility
3300 Honoapiilani Highway
Honokowai, Lahaina, Maui, Hawaii 96761-9413

County of Maui Contacts:

Dave Taylor, Wastewater Reclamation Division Chief
Phone: (808) 270-7421
e-mail: David.Taylor@co.maui.hi.us

Cheryl K. Okuma, Esq., Director
Phone: (808) 270-8230
e-mail: Cheryl.Okuma@co.maui.hi.us

County of Maui, Department of Environmental Management
2200 Main Street, Suite 100
Wailuku, Maui, Hawaii 96793

EPA Contacts:

United States Environmental Protection Agency, Region 9
Ground Water Office, WTR-9
75 Hawthorne Street
San Francisco, CA 94105

Nancy Rumrill, Environmental Engineer
Phone: (415) 972-3293
e-mail: Rumrill.Nancy@epa.gov

David Albright, Manager
Phone: (415) 972-3971
e-mail: Albright.David@epa.gov

12.0 Budget Estimate

<u>TASK</u>	<u>ESTIMATED COST</u>	<u>POH FUNDED</u>	<u>DOH WORK IN-KIND</u>
Project Management	\$21,500	\$14,000	\$7,500
Finance/Accounting	\$5,000	\$5,000	---
USACE P2	\$2,500	\$2,500	--

Scheduling/Reporting			
Inter-Island Travel	\$1000	\$500	\$500
Phase I Tasks	\$125,000	125,000	--
CESU Researcher	\$101,750	\$101,750	--
CESU Researcher DOH (17%)	\$17,298	\$17,298	--
ERDC Contract Oversight (5% of total CESU)	\$5,952	\$5,952	--
Phase II Tasks	\$140,000	--	\$140,000
Report Compilation	\$2,000	\$2,000	--
QC Review	\$3,000	\$1,000	\$2,000
TOTAL	\$300,000	\$150,000	\$150,000